Graduate Student Journal of Psychology
Fall 2025 - Vol. 25

Pretty Privilege vs. Ingroup Bias in Decision Making

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In-group and attractiveness bias are well-established concepts in social psychology. This study examines the concurrent influence of these concepts on the decision-making process using the Minimal Group Paradigm. Confederates, individuals who appear to be participants, were used to simulate out-group members. Participants (n = 119, aged 20–30 years) answered a series of mathematics questions, followed by a response, agreeing or disagreeing with the participant's answer, from a confederate. Participants were then asked to rate the attractiveness of the confederates. Results indicated that in-group bias significantly outweighed attractiveness bias. Participants changed answers more frequently when their group disagreed, regardless of the confederate's attractiveness. Results highlighted the robust effects of group membership on decision-making. Additional research is required to explore confounds within decision-making, such as individual differences and familiarity bias.

Keywords: in-group bias, attractiveness bias, decision-making, minimal group paradigm, group dynamics

Throughout our lives, we face situations that require us to make appropriate and sound decisions. Often, people make decisions under the misconception that their choices are purely the result of objective and conscious processing. Nonetheless, research indicates that we are susceptible to external influences, including attractiveness and in-group bias (Mackie & Ahn, 1998; Voit et al., 2021). Attractiveness and in-group bias may lead individuals to form inaccurate beliefs, which in turn influence decision-making. Attractiveness bias refers to the tendency for individuals to positively view attractive people, solely on the basis of their physical appearance (Shahani et al., 1993). Meanwhile, in-group bias refers to individuals' tendency to view members of their own group positively, which is driven by perceived group membership (Knoblock-Westerwick et al., 2020). Studies examining attractiveness bias and its influence in a group setting have shown that attractive individuals are stereotyped as being more trustworthy, leading to favoritism within groups (Cellerino, 2013). Although research has considered the impact of attractiveness within in-groups, little research has evaluated their simultaneous impact. When individuals face a conflict between appealing to attraction and in-group bias, it is unknown which factor has a greater influence on the decision-making process. The current study aims to explore the outcome of these conflicting influences on individuals' decisions.

In-Group Bias

In-group bias describes the tendency of an individual to favor members of their own group (Scheepers et al., 2006). For early humans, the development of collaborative social systems (i.e., division of labor and trade) ensured survival (Baumeister et al., 2015). Although salient, group membership results in out-group members being less persuasive as compared to in-group members (Mcgarty et al., 1994). When examining the influence of national in-group identity on persuasiveness, Adam-Troian et al. (2020) found that when national group identities were made salient, negative attitudes towards ethnic minorities (out-group) were more prevalent. Furthermore, it has been established that humans are innately drawn to their own group and display out-group xenophobia (Tidwell et al., 2017). These traits have historically led to greater survival rates.

In-group bias has been prevalent since ancestors formed closely connected groups that competed with others for survival (Hare, 2017). Presently, group adhesion is central across various fields, including education and conventional workplaces (Rathbone et al., 2023). When examining how individuals behave in the presence of other in-group members, Castelli et al. (2008) found that individuals exhibited more egalitarian responses when their behaviors aligned with the group's social norms. Additionally, while egalitarian group members were not subject to active discrimination, in-group members who exhibited behaviors aligned with the group's collective interest received more favorable evaluations (Castelli et al., 2008). If an individual expressed negative attitudes toward egalitarian members, it could diminish the group's overall cohesion and potential contributions. Consequently, individuals are less inclined to engage in prejudiced behavior and are more likely to make decisions they perceive as beneficial to the group's welfare (Terry et al., 2000). This is supported by Terry et al. (2000), which looked at attitudes and behaviors in terms of in-group bias and decision-making. Participants took part in a mock-jury paradigm in which they were presented with a hypothetical case and asked to render a verdict based on the evidence provided. Participants were

more likely to make decisions consistent with their attitudes when they aligned with the in-group's attitude (Terry et al., 2000).

Many organisations thrive on teamwork, as performance is largely dependent on group members' ability to work together towards a common goal (Espín et al., 2019). Consequently, groups may be hindered or facilitated by in-group bias, underscoring the importance of identifying when it is present. Chai et al. (2022) showed that in-group bias was present between the ages of 5 and 6. When given a fictional story about an in-group/out-group member's sharing behavior, researchers predicted that in-group members would share more than their out-group peers. As such, it is worth noting that these biases became stronger in different contexts, and achieving intergroup collaboration can depend on how well in-group biases are managed (Li et al., 2021). When Li et al. (2021) investigated fate control — the belief that the future is largely predetermined but can be influenced by individuals' actions — on in-group bias during the COVID-19 pandemic, it was found that higher fate control was associated with higher risk perception, and this led to stronger in-group bias in donating to help with COVID-19. However, such behaviors change when resources are scarce. Cui et al. (2023) looked at how participants allocated resources to themselves and an in-group/out-group. The in-group bias was more prevalent in the scarcity condition, where participants were observed to allocate more resources to in-group members. These studies highlight situations when in-group bias increases, allowing either to reduce its harm or use it for positive outcomes.

In-group bias can manifest in the tendency to agree with the group's opinions (Scheepers et al., 2006). This can be seen through members favoring members of their own group, with individuals being more likely to select attractive people as being supporters of their own party (Nicholson et al., 2016). In addition, Knippenberg and Wilke (1992) investigated the effects of framing arguments on persuasiveness. Participants were presented with arguments that either aligned or contradicted their group's attitudes and arguments. Results show that individuals were most likely to agree with the argument that best aligned with their group's views. Another expression of in-group bias is evident in the tendency to agree with group decisions depending on the salience of group identity. Skinner and Stephenson (1981) explored how highlighting group identity and contrasting in-group views with out-group views influences individuals' expression of their opinions. It was found that emphasising group affiliation led to participants intensely expressing their opinions, agreeing with group views. These findings highlight how in-group bias shapes individual decision-making.

Formation of a "Group"

It is widely known that individuals are more likely to cooperate with others with whom they share a group identity (Calanchini et al., 2022). However, recent evidence suggests that prior interaction may not be necessary to identify them as an in-group member (Kurzban et al., 2001). Instead, humans use symbolic cues and other ways to elicit favoritism towards in-group members. Hence, to create a group in laboratory settings, it is necessary to understand the Minimal Group Paradigm, which consists of three main components (Otten, 2016). Firstly, categorization must be novel and arbitrary, meaning there must be no history of experiences with any in-group or out-group. Second, categorization is anonymous; participants are to have no face-to-face interaction with group members. Lastly, there are no direct relationships between allocations and self-interest. A minimal group designed correctly should evoke behaviors where individuals favor their own group members.

The Minimal Group Paradigm

Montalan et al. (2012) examined empathy towards in-group/out-group members using the Minimal Group Paradigm. Participants were split into two groups using a dot-estimation task: the underestimators (who allegedly underestimated the number of dots shown) and the overestimators (who allegedly overestimated the number of dots shown). Due to the fictive nature of the groups, participants would have had no previous experiences with the in-group or out-group. After participants were split into groups, participants did a pain stimulator task individually, having no face-to-face interactions with other members. Results showed evidence of in-group bias: participants made decisions to show more empathy for those in their own group in comparison to those in the out-group.

In another study, Reynolds et al. (2007) looked at predisposing factors that could lead to discrimination. Participants were assigned to minimal groups. Participants in the random condition were told that group

allocations were done on a completely random basis. On the other hand, participants in the voluntary condition were asked to circle the group they wanted to be in. After the group assignment, participants completed various personality measures. Results showed behaviors expected of an in-group member, with in-group identification alone being the strongest predictor of participants' tendency to discriminate.

Attractiveness

Attractiveness plays an undeniable role in evolutionary success, with attractive traits being associated with potentially fitter offspring (Gangestad & Scheyd, 2005). Although it is difficult to standardize an attractive face, certain features are preferred. Attractive women often had fuller lips, high-arched eyebrows, smaller and more tapered noses, and less angular jaws (Pflüger et al., 2012). These feminine features were associated with disease resistance, high estrogen levels, and fertility (Muñoz-Reyes et al., 2014). In men, those with large eyes, prominent cheekbones, large chins, big smiles, and high-status clothing were considered attractive (Cunningham et al., 1990).

Attractiveness Bias

Attractiveness plays a role in social encounters, as many first impressions are based on visual features (Nordholm, 1980). Attractive people are often associated with positive personality traits, such as being sociable and intelligent (Tsukiura & Cabeza, 2010). Whereas non-attractive individuals are characterised by negative personality traits, such as being less altruistic and less intelligent. In their study of attractiveness and selective bias in attributing moral character, Tsukiura and Cabeza (2010) found that attractiveness biases hinder perceptions of others. Participants were more likely to attribute moral states to attractive rather than less attractive individuals. In addition, attractive individuals are more highly rated in perceived warmth in comparison to non-attractive individuals (Klebl et al., 2021). This is due to the beauty-is-good (BIG) stereotype.

The BIG stereotype can be explained using the halo effect: the positive evaluation of one trait influences the evaluation of other unrelated characteristics (Klebl et al., 2021). Individuals perceive attractive people as more correct, and this can lead to the desire to conform to their decisions. Batres and Shiramizu (2022) looked at attractiveness having a "halo effect," where people associated social desirability with attractive individuals and provided evidence of the halo effect cross-culturally. Hence, simply being attractive produces a "halo" effect that increases the chances of other people assigning positive traits to them, impacting the decision-making process.

Being perceived as attractive offers advantages in various aspects of life. In relationships, many attractive people report being more satisfied with their dating life (Berscheid et al., 1971). In a job setting, it was found that non-attractive job candidates need to submit 33% more applications in comparison to their attractive counterparts (Maurer-Fazio & Lei, 2014). Additionally, unattractive individuals were found to earn 7–10% less than average-looking individuals (Hamermesh & Biddle, 1993). As well as this, attractive people were found to pay lower bail and fine amounts for misdemeanor charges (Downs & Lyons, 1991). In Griffin and Langlois' (2006) study, the advantages of attractiveness and the disadvantages of unattractiveness were examined. The results suggested that being unattractive has disadvantages, with adults and children both giving low scores of positive attributes (sociability, altruism, and intelligence) to unattractive individuals. Another study also found that more physically attractive individuals were viewed in both a positive light and more accurately in first impressions (Lorenzo et al., 2010). Individuals forming quick impressions often lead to inaccurate judgments, and these biases influence the decision-making process in many different social situations (Zuckerman et al., 1995).

People often make inferences about individuals' character by judging their facial appearance (Øvervoll et al., 2020; Willis & Todorov, 2006). As exposure to individuals with attractive faces increases due to media portrayal, it is important to know how often this occurs. In Herbozo et al.'s (2004) study, where three raters coded messages present in children's videos, it was found that 72% of the analyzed videos emphasized physical attractiveness. Additionally, 84% of the videos associated female attractiveness with sociability and kindness. The results from this study indicate the prevalence of attractiveness stereotypes, hence the need to understand how this can affect decision-making. Willis and Todorov (2006) investigated the conditions in which participants are likely to make inferences based on facial appearance. It was found that merely exposing participants to images for 100 milliseconds was enough for judgments of attractiveness to be made.

Additionally, longer exposure time was found not to affect participants' judgement of characteristics. Such results show that exposing participants to just the face region is sufficient in generating attraction judgements.

The Chicago Face Database (CFD) was created using face morphing software and provides sets of faces and norming data (Ma et al., 2015). The benefits of using the CFD include access to a large variety of faces (Ma et al., 2020). The availability of large databases of faces offers the potential for valuable contributions to the field of psychology. The CFD has previously been used in various research done on appearances (Freud et al., 2020; Landy et al., 2020; Marini et al., 2021).

Impact of Attractiveness on In-Group Bias

Despite the concrete evidence on in-group bias, recent research suggests that group membership biases are malleable (Rudman et al., 2001). Rudman et al.'s (2001) study demonstrated that affective and cognitive processing play a role in reducing prejudice. Furthermore, individuals' prejudices are dependent on their biases as well as the situation. Despite compelling evidence of the impact of in-group bias, the influence is not absolute. Dang et al.'s (2019) study was conducted to look at the impact of criticism on in-group favoritism. When participants were criticized by an authoritative outside figure, it was found that in-group favoritism decreased. It was proposed that these results were due to the authoritative figures being viewed with admiration and possessing qualities that are considered attractive. However, the study did not investigate its impact on the subsequent decision-making of the group members. Additionally, those who were experiencing a threat to their social self-esteem (their in-group) allocated fewer resources to their own group members, showing a decrease in behavior consistent with in-group bias. However, substantial research is still required on the interaction between attractiveness and group membership. In another study, Kniffin et al. (2014) explored how perceptions of leader attractiveness are influenced by group membership. The results from this study were that in-group leaders were rated as more attractive than out-group leaders. This finding suggests that, despite similar levels of familiarity with both leaders, the out-group leader's attractiveness was not stronger than the in-group bias.

The impact of attractiveness on groups has been recognized as influencing people's feelings and behaviors (Krendl et al., 2011). A study looked at sorority recruitment and what factors influenced acceptance of potential members into high-status and low-status groups. The results revealed that high-status sororities prioritized the attractiveness of participants during the decision-making process. These results highlight the complexity behind the effect of attractiveness on social groups, and the increased likelihood of accepting a member depending on attractiveness.

Individuals affiliate with others who are like themselves, and many groups are formed by a shared interest in certain topics (Chen & Kenrick, 2002). A study was conducted to investigate the effects of group membership on the perception of others. Results showed that individuals assumed that other members of the in-group share attitudes similar to their own, and that out-group members tend to have attitudes dissimilar to their own. Interestingly, it was found that when a member of the out-group shares similar attitudes, participants become more attracted to them, especially when the out-group has negative stereotypes. These results suggest that although an individual may be part of the out-group, it is possible that there are other external factors that can change how an in-group member perceives them and consequential decision-making. Given that most research looks at how in-group bias interacts with attractiveness, there is a need to examine scenarios wherein they contradict each other.

While there have been many independent studies on attractive and in-group bias, further research is needed to investigate their conflicting influence. Results studying these two factors affect our understanding of decision-making and the need to consider attractiveness while forming decision-making groups (e.g., jury panels, debating teams, and soccer teams). With research suggesting that in-group bias is not as resilient as previously believed, there is a possibility that the attractiveness of an out-group member will affect how strong in-group behaviors are. Furthermore, results further support the use of the CFD in future experiments. Further research is required to delve into decision-making and how attractiveness can interfere with in-group bias to affect this process. Hence, the purpose of the current experiment is to investigate whether attractiveness influences in-group bias. It is hypothesised that the presence of an attractive out-group member will overpower in-group bias and participants will be more likely to change their answer when they deem

the out-group member attractive, regardless of their group's answer.

Method

Participants

The convenience sample consisted of 119 University of Technology Sydney (UTS) students aged 20 to 30. Recruitment was conducted through online postings on the SONA system, and participants were reimbursed with 0.5 credits for their participation.

Ethical Clearance

Ethical clearance to conduct research with human subjects was obtained through UTS Psychology Low and Negligible Risk (LNR) Ethics Panel (G-15-2023; see Appendix A). Informed consent from participants was obtained through a Participation Information Sheet provided prior to the commencement of the study. Participants were informed that they could withdraw consent at any time without penalty.

The CFD

The study utilized the CFD (Ma et al., 2015). For the purposes of the current experiment, only eight faces were chosen as the confederates. Using the norming data provided, the chosen faces had to be between the ages of 20 and 30, as this reflected the ages of the participants. This allows for controlling age as a confounding variable for perceived attractiveness, as it has previously been shown that younger people are considered more attractive (Zebrowitz & Franklin, 2014). For the CFD, attractiveness was measured on a 7-point Likert scale (1 = *least attractive* to 7 = *most attractive*). The images used (confederates) were chosen from the extreme ends of the given attractiveness ratings. Four of the most highly rated faces were chosen as the attractive confederates. This included faces with the ratings of 5.48, 5.31, 5.24, and 5.12. In addition, four of the lowest-rated faces were chosen as the non-attractive confederates. This included faces with the ratings of 1.61, 1.55, 1.54, and 1.52. Attractiveness ratings and ages were the only two factors considered when choosing confederates.

The Minimal Group Paradigm

To stimulate in-group bias in a short period of time, the current study utilized the Minimal Group Paradigm (Otten, 2016). Creating a new group was necessary as it eliminates the confounding effect of biases on results. This means that any preconceptions and previous experiences would not influence participants' responses.

It has been established that prior interaction may not be necessary for participants to identify themselves as an in-group member (Kurzban et al., 2001). Additionally, it has been found that merely categorizing individuals into two social groups is enough to elicit behaviors of group members.

A novel or arbitrary categorization means participants had no prior experiences with the in-group or out-group. The current experiment addresses this through participants being randomly assigned to groups, as well as them being informed that their groups are based on their study sign-up time. This also ensured that participants had no relationship between their allocated group and their self-interests. Anonymous categorization means participants do not have any face-to-face interactions with in-group or out-group members. The online nature of the experiment addresses this. Participants' identities were kept anonymous, and they did not encounter other participants. A minimal group designed correctly will evoke behaviors of in-group favoritism (Hertel & Kerr, 2001).

This study utilized the Minimal Group Paradigm in an online format. Janneck et al. (2013) conducted an experiment to replicate the Minimal Group Paradigm in an online setting. Arbitrary groups were created, and varying degrees of information about other group members were made available to participants. In both informal and work settings, participants showed in-group favoritism. Additionally, when less information was made available to participants, in-group bias was more prominent. This study exhibits the effectiveness of Minimal Group Paradigms in online settings.

Online Groups

The current study was conducted online via Qualtrics. This was due to convenience, time constraints, financial constraints, and being a standard practice for research conducted with UTS. Furthermore, online environments allow for the convenience in creating and conducting experiments involving manipulation online if the task does not require any physical presence (Horton et al., 2010). This environment ensured participant anonymity while allowing for controlled deception regarding the existence of other peers.

Group Allocation

Participants were informed that there were groups as well as independent individuals. However, the participants were unaware that they had been placed in

Group A and completed the study individually at different times. They were informed that their group allocation was dependent on the time frame in which they signed up for the study. As per the Minimal Group Paradigm, categorization was novel, and there was no relationship between allocations and participants' self-interests.

Testing Phase

To ensure that participants answered honestly, they were informed that their responses and choices would be anonymous (Schitter et al., 2019). Participants were asked to complete eight multiple-choice mathematics questions (see Appendix A). They were given 10 seconds to answer each question. None of the questions had correct answers. The intention was to create uncertainty within the participants regarding the correct answer.

After the participants answered each question, they were shown a summary of their group's (Group A) response and a response from a confederate (see Appendix B). The responses from the group and the confederate were predetermined and not dependent on active participation. The eight possible responses were randomized (see Table D1). Participants were then given 10 seconds to decide if they wanted to change or retain their answer. This was repeated eight times.

Rating Phase

After participants had completed the mathematics questions and made their decision to change or maintain their original question, they were asked to state whether they think the person in the image is attractive in a yes/no questionnaire (see Appendix C). Although the more "attractive" faces from the CFD have been included, it is important to factor in individual preference. Participants were again reminded that their responses were kept anonymous.

Calculator Use and Debrief

Participants with incomplete responses and participants who responded "Yes" when asked whether they used a calculator had their responses removed. A total of 32 responses were removed. Participants were then informed of the manipulation being used. They were debriefed as per UTS requirements.

Results

Data Management

Data was collected on Qualtrics, and a copy of the data was placed on UTS's OneDrive as per UTS's requirements. Data was de-identified and password-protected. Data was de-individualized and exported onto a personal laptop to conduct analysis, and was deleted promptly after data analysis was complete.

Statistical Test and Hypothesis

The relationship between in-group bias and attractiveness bias was examined using a Chi-squared test of independence. This was done by looking at participants' likelihood of changing their answer when presented with the group and an attractive/unattractive individual who agreed or disagreed with their answer.

Chi-Square Test of Independence

Attractiveness of Confederate vs. Answer Change

The results of the Chi-squared test of independence revealed no significant difference between answer change and attractiveness, $X^2(1, N = 696) = 2.12$, $p = .145$. There was some variation between the observed and expected scores (Table D2 in Appendix D), and participants were more likely to retain their answer when the confederate was unattractive (see Figure 1). However, the Chi-squared test of independence indicated that these results were non-significant ($p > .05$). Cramér's V of .06 revealed little, if any, association between the two variables.

Group Response vs. Answer Change

Results from the Chi-squared test of independence revealed a significant relationship between group response and answer change, $X2(1, n = 696) = 20.80$, $p < .001$. There was variation between observed and expected results (Table D3 in Appendix D). Participants were more likely to change their answer when the group disagreed with their answer (see Figure 2). Cramér's V value of .17 revealed the strong relationship between the two variables.

Attractiveness vs. Answer Change When Group Agrees and Confederate Disagrees

The Chi-squared test of independence was used to examine the relationship between answer change and attractiveness bias when the group agreed, and the confederate disagreed with the participants' answer. It showed that the relationship between these two variables was non-significant, $X^2(1, n = 348) = 1.88$, $p = 1.70$. Although there was some variation in observed (Figure 3) and expected values (Table D4 in Appendix D), Cramér's V of 0.07 revealed the low association between answer change and attractiveness of the confederate when the group agrees, and the confederate

disagrees with participants' answers.

The relationship between the answer change and attractiveness when the group disagreed and the confederate agreed with the participant's answer showed no significance, $X^2(1, n = 348) = 0.34, p = .562$. There were variations in observed and expected scores (Table D5 in Appendix D), and the likelihood of retaining an answer was observed (Figure 4), but the Chi-square test of independence showed that there was no significant difference between conditions. The Cramér's V of .03 revealed little to no significance between answer change and attractiveness in this context.

Discussion

The aim of the study was to examine whether attractiveness influences in-group bias. More specifically, the present study investigated whether the presence of an attractive out-group member would override the effects of in-group bias in decision-making. Contrary to the initial prediction that participants would be more likely to change their answer in the presence of an attractive out-group member, the results of the study revealed no significant differences. This suggests that attractiveness does not affect in-group bias. However, group responses had a significant effect on whether participants changed their answers. More specifically, when the group disagreed with the participant's answer, participants were more likely to change their answer, irrespective of the attractiveness of the out-group member (confederate). This suggests that in-group bias is stronger than the attractiveness bias. Such results highlight that the Minimal Group Paradigm is a valid approach to developing a sense of cohesion within individuals.

There was a lack of significant findings when looking at:

1. Individuals' ratings of attractiveness versus answer change.
2. Individuals' ratings of attractiveness versus answer change when the group agrees and the confederate disagrees.
3. Individuals' ratings of attractiveness versus answer change when the group disagrees and the confederate agrees.

The current study explored the contradicting effects of attractiveness and in-group bias, and the weight individuals give each influence by creating a situation wherein these two influences come into conflict. While both factors are known to have an influence on individuals, the current study reveals their relative weighting. Results suggest that in-group bias has a stronger influence than attractiveness on decision-making.

A few factors could explain the findings. The context in which participants were required to decide may have led to these results. Based on previous research, the nonsignificant results suggest that although attractiveness has been shown to have a "halo effect" on individuals, its influence may not be as strong as in-group bias (Batres & Shiramizu, 2022). Such results highlight the importance of social context over individual traits. Another notable limitation is the lack of direct supervision during survey completion. Without supervision, there is a possibility of participants colluding with other participants. Such interactions could disrupt the Minimal Group Paradigm and affect the findings.

While it is clearly identified that in-group bias had a stronger influence than attractiveness bias, there was substantial variation in the responses of individuals. This suggests the possibility of other factors having an influence on the results. While this level of analysis is beyond the scope of the current study, a comprehensive analysis on some confounding variables is worthwhile for future research.

Individual Differences

Individual differences could have also played a role in the insignificant results. These differences affect how individuals interact with the world and could affect how participants perceive group dynamics and attractiveness (Newheiser et al., 2012). Although the relationship between attractiveness and answer change was insignificant, participants were most likely to retain their answers when they found the confederate unattractive. This suggests the possibility that the influence of attractiveness and in-group bias has differing levels of influence on different individuals.

This is not the first study identifying the impact of individual differences in terms of decision-making. A study looking at a dual-strategy model of reasoning suggests that people have two reasoning strategies which affect the way social cues affect them (Gagnon-St-Pierre et al., 2021). This includes a statistical strategy which involves estimating a likely conclusion of a social interaction or the counterexample strategies which involve generating counterexamples of a con-

clusion. Results from this study suggest that these processing distinctions underlie individual differences in responding to attractiveness and in-group bias.

Cultural Differences

The current study did not identify culture as a confounding variable, and this could prove to be a rich area of research for the future. The sample was a convenience sampling, meaning participants were selected due to availability. All participants were also enrolled in an Australian university. While their cultural identification was not collected, it can be assumed that students have had interactions with Australian culture, which is a highly individualistic culture (Emiko & Hidehumi, 2019). Cultural differences are known to affect how individuals perceive others who are part of their group (Sam & Berry et al., 2010). Hence, it is possible for individuals to have varying levels of loyalty to their group. Cox et al. (1991) examined the role of cultural backgrounds on teamwork. It was found that people from collectivist cultures displayed more cooperative behaviors compared to those from individualistic cultures. In other words, people from collectivist cultures place more emphasis on group success compared to individual success. In another study, Fischer and Derham (2016) examined cultural influences on in-group bias across 18 societies. The results showed that in-group bias was present but varied across the societies. The variation of in-group bias was dependent on the following cultural influences: individualistic versus collectivist cultures, uncertainty avoidance, and power distance. Similarly, it was found that collectivist cultures tend to exhibit stronger in-group biases. In cultures wherein hierarchical structures are more acceptable, more in-group behaviors were displayed. Cultures with high uncertainty avoidance, the extent to which individuals are affected by unfamiliar/unknown situations, displayed high levels of in-group bias. These cultural differences can affect how substantial the influence of attractiveness is in a group setting.

Personality Traits and Familiarity Bias

Personality traits have also been shown to influence responses to social cues. Traits such as agreeableness, extraversion, openness, and conscientiousness have been linked to group cohesion (Larsen et al., 2020; Saapna & Suman, 2012). This may shape how individuals engage with attractive others, affecting decision-making. Additionally, familiarity bias –where repeated exposure increases preference – was not accounted for in the current study (Monin, 2003). Prior research shows that even brief exposure to faces can enhance attractiveness ratings (Rhodes et al., 2001) and increased interaction fosters interpersonal attraction (Rei et al., 2001). Both these factors may have influenced responses and, therefore, should be considered as potential variables in future research examining the interplay between in-group bias and attractiveness.

Implications

The results from the current study suggest that facial attractiveness—a measure of overall attraction—is dependent on the context, and in situations where there are other social cues—such as in-group bias—it may not be as influential. This demonstrates the benefits of considering social context when looking at how attractiveness influences behaviors. Rather than solely addressing and mitigating the attractiveness bias in a group setting, it may be more advantageous to promote inclusive behaviors and encourage the acceptance of out-group individuals.

Results from previous experiments show that a properly designed Minimal Group Paradigm promotes in-group behaviors. This study's results support the fact that arbitrarily created groups can lead individuals to display in-group behaviors, as indicated by individuals choosing to change their answers when the group disagreed with them. These findings enhance the understanding of the underlying themes of group creation and allow for the promotion or mitigation of group biases.

Future Directions

Future research should consider replication of the current experiment in broader contexts with application of potential factors as described above and beyond,such as considering subjectivity due to race and/or ethnicity. Exploring dimensions such as personality traits and familiarity bias not only mitigates some individual differences but also offers a better understanding of different ways other dimensions interact with attractiveness and whether this could override other biases, such as in-group bias.

While the current study did not offer evidence for the effect of attractiveness on answer changes in group settings, it further supports evidence of in-group bias in decision-making. It enhances the understanding of social influences and encourages further research on how individual characteristics interact in group settings.

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Table D1

Response Possibilities

Group A	Group B
Agree	Agree
	Disagree
Disagree	Agree
	Disagree

Note. This table displays all the possible responses from Group A and Group B.

Figure 1

Answer Change vs Attractiveness of Confederate

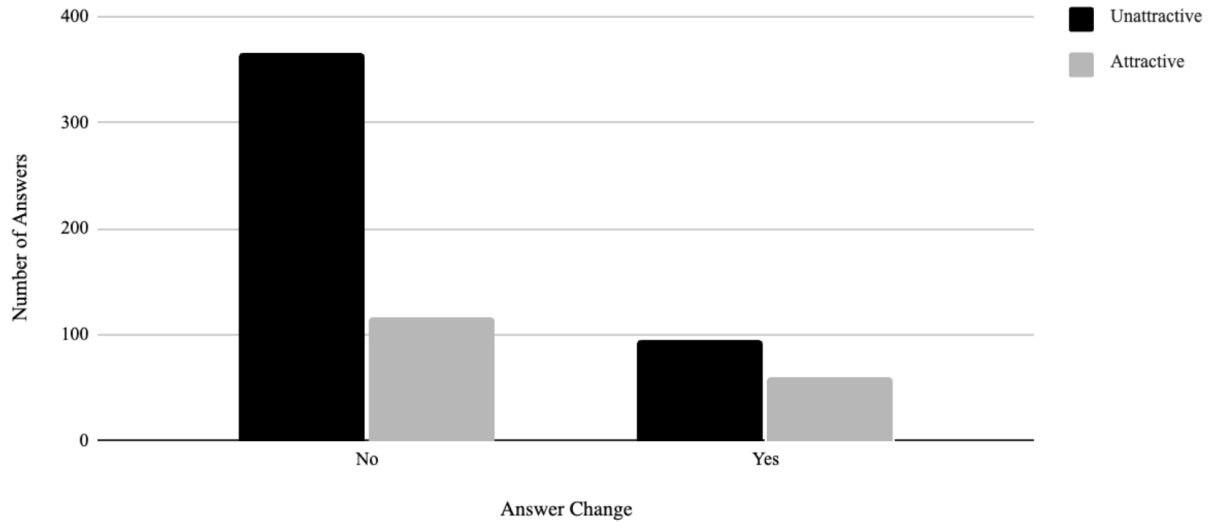


Figure 2

Group Response vs. Answer Change

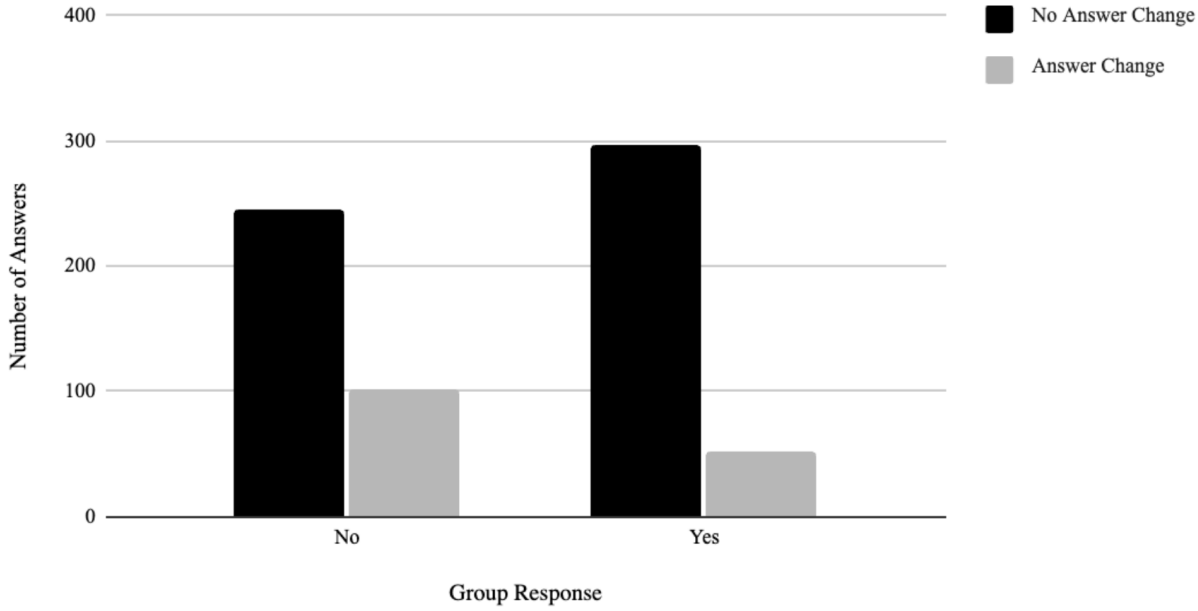


Figure 3

Attractiveness vs Answer Change when Group Agrees but Confederate Disagrees

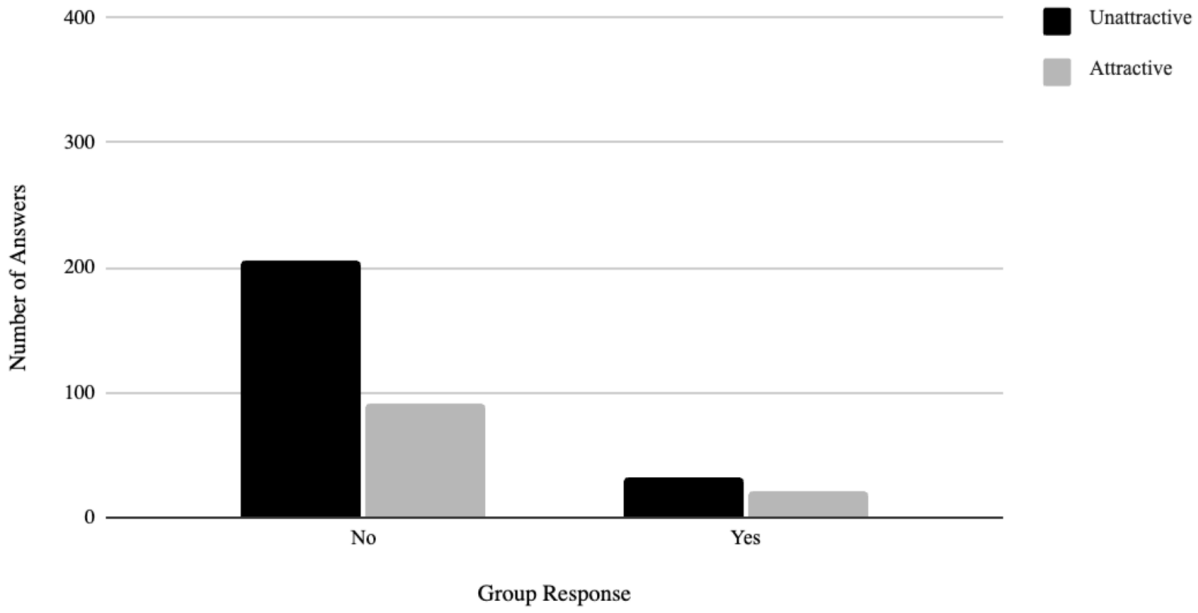
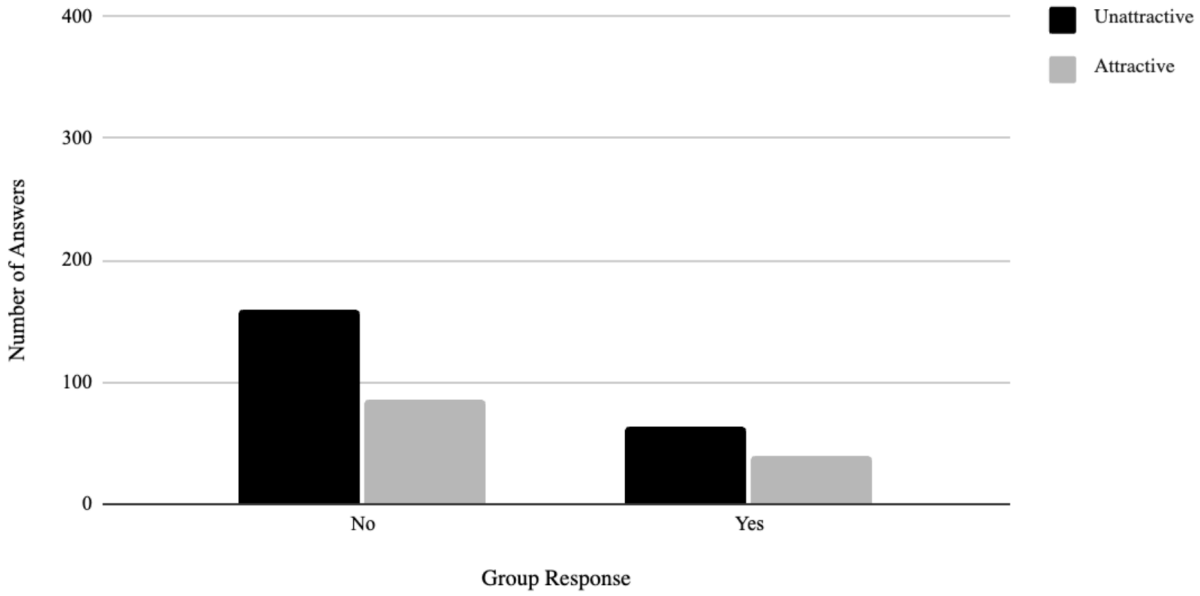


Figure 4

Answer Change vs. Attractiveness When Group Disagrees and Confederate Agrees



Appendix A

Quiz

This appendix consists of the mathematical questions and summaries of group and confederate answers.

1. √8.237 = ?
    a) 2.56
    b) 2.67
    c) 2.78
    d) 2.97

1a. Members of Group A agree with your answer.
This member of group B disagrees with your answer.
Are you going to change your answer?
    a) Yes
    b) No

2. √7.338 = ?
    a) 2.134
    b) 2.456
    c) 2.356
    d) 2.982

2a. Members of Group A disagree with your answer.
This member of group B agrees with your answer.
Are you going to change your answer?
    a) Yes
    b) No

3. √10.234 = ?
    a) 3.356
    b) 3.423
    c) 2.951
    d) 2.999

3a. Members of Group A agree with your answer.
This member of group B disagrees with your answer.
Are you going to change your answer?
a) Yes
b) No

4. √4.222 = ?
    a) 1.572
    b) 2.132
    c) 1.794
    d) 1.994

4a. Members of Group A disagree with your answer.
This member of group B agrees with your answer.
Are you going to change your answer?
a) Yes
b) No

5. √12.343 = ?
a) 2.988
b) 3.261
c) 3.942
d) 3.619

5a. Members of Group A agree with your answer.
This member of group B disagrees with your answer.
Are you going to change your answer?
a) Yes
b) No

6. √85.263 = ?
a) 9.163
b) 8.859
c) 7.295
d) 9.255

6a. Members of Group A disagree with your answer.
This member of group B agrees with your answer.
Are you going to change your answer?
a) Yes
b) No

7. √124.33 = ?
a) 12.483
b) 12.131
c) 11.173
d) 11.298

7a. Members of Group A agree with your answer.
This member of group B disagrees with your answer.
Are you going to change your answer?
a) Yes
b) No

8. √78.452 = ?
a) 7.762
b) 8.583
c) 7.589
d) 8.969

8a. Members of Group A disagree with your answer.
This member of group B agrees with your answer.
Are you going to change your answer?
a) Yes
b) No

Appendix B

Attractiveness Questionnaire

This appendix consists of the questions regarding whether participants find the confederates depicted attractive.

1. Is this person attractive?

A. Yes
B. No

2. Is this person attractive?

A. Yes
B. No

3. Is this person attractive?

A. Yes
B. No

4. Is this person attractive?

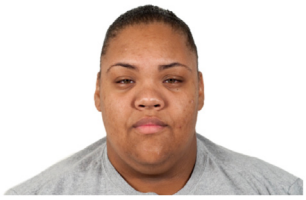
A. Yes
B. No

5. Is this person attractive?

A. Yes
B. No

6. Is this person attract

A. Yes
B. No



7. Is this person attractive?

A. Yes
B. No

8. Is this person attract

A. Yes
B. No

Appendix C

Contingency Tables

Table D2

Contingency Table for the Attractiveness of Confederate and Answer Change

Answer Change		Unattractive	Attractive	Total
No	Observed	365	177	542
	Expected	357	184.0	542
Yes	Observed	94	60	154
	Expected	102	52.40	154
Total	Observed	459	237	696
	Expected	459	237	696

Note. $n = 696$

Table D3

Contingency Table for Group Response vs Answer Change

Group Response		No Answer Change	Answer Change	Total
No	Observed	246	102	348
	Expected	271	77	348
Yes	Observed	296	52	348
	Expected	271	77	348
Total	Observed	542	154	696
	Expected	542	154	696

Note. $n = 696$

Appendix C (cont.)

Table D4

Attractiveness and Answer Change When the Group Agrees and Confederate Disagrees

Answer Change		Unattractive	Attractive	Total
No	Observed	205	91	236
	Expected	200.70	95.30	296
Yes	Observed	31	21	52
	Expected	35.3	16.7	52
Total	Observed	296	52	348
	Expected	296	52	348

Note. $n = 348$

Table D5

Attractiveness and Answer Change When the Group Agrees and Confederate Disagrees

Answer Change		Unattractive	Attractive	Total
No	Observed	160	86	246
	Expected	157.60	88.40	246
Yes	Observed	63	39	102
	Expected	65.40	36.60	102
Total	Observed	223	125	348
	Expected	223	125	348

Note. $n = 348$